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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
FERRIS III, FRED O	
ART UNIT	**PAPER NUMBER**
2128	

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/942,419	FISCHER ET AL.	
	Examiner	Art Unit	
	Fred Ferris	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *14-18* is/are allowed.

6)☒ Claim(s) *1-13,19 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 April 2005* is/are: a)☒ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-20 have been presented for examination based on applicant's amendment filed on 14 April 2005. Claims 1-13 and 19-20 remain rejected by the examiner. Claims 14-18 have been allowed over the prior art of record.

Response to Arguments

2. Applicant's arguments filed 14 April 2005 have been fully considered.

Regarding applicant's response to drawing objections: The examiner withdraws the objection to the drawings in view of applicants proposed drawing changes to figure 5 and new figure 7 submitted 14 April 2005.

Regarding applicant's response to 101 rejection: Per claims 1-2: Claim 1 appears to be drawn to a dynamic relationship between the subdivided elements and freedom (DOF) values. While applicants have amended claim 1 to recite "a computer readable medium", it is not clear from the claim language what's actually stored on the medium. In this case the output appears to simply be nonfunctional data stored on a disk. (See: MPEP 2106) Per claims14-18: The examiners withdraws 101 rejection of claims 14-18 in view of applicant's amendment and arguments file 14 April 2005 since the claimed tetrahedralization filter is interpreted as an apparatus. Per claims 3-13, 19-20: Applicants have argued that pending claims 3-13 and 19-20 meet statutory subject matter requirements and have referenced the Federal Circuit Court's ruling regarding ***State Street*** *and* ***Excel Communications*** *in arguments relating to practical application of the claimed invention. The examiner agrees that, in the case of Excel (now U.S.*

5,333,184), claims are in fact drawn to statutory subject matter. For example claim 1 of U.S. 5,333,184 recites:

"1. A method for **use in a telecommunications system** in which **interexchange calls initiated by each subscriber** are automatically **routed over the facilities of a particular one of a plurality of interexchange carriers** associated with that subscriber, said method comprising the steps of:

generating a message record for an **interexchange call between** an **originating subscriber and a terminating subscriber**, and

including, in said **message record**, a **primary interexchange carrier (PIC) indicator** having **a value** which is a function of **whether or not** the **interexchange carrier** associated with said **terminating subscriber** is **a predetermined one** of said **interexchange carriers**."

Claim 1 of U.S. 5,333,184 meets the requirements by being "useful" (i.e. a telecommunications system inter-exchanging calls initiated by subscribers routed over facilities), "tangible" (i.e. generating a message record for an inter-exchange call between an originating and terminating subscriber), and "concrete" (i.e. the result is assured since the PIC has a value contained in the message record indicating inter-exchange carrier association)

In sharp contrast, the pending claims of the present invention clearly do not recite a similar practical "useful" application of the output in the technological arts and are not drawn to a concrete and tangible result since they appear to involve mathematical modeling of abstract ideas. For example, claim 3 of the present invention recites:

"A tetrahedralization method, comprising at least the steps of:
providing a non-conformal mixed element mesh comprising elements subdividable into tetrahedra, and identifying respective degree of freedom values for the elements in the mesh;
performing element subdivision based on the degree of freedom values of elements in the mesh."

In this case, the claim recites no limitations relating to a practical application in the technological arts and appears to simply involve mathematical modeling of abstract ideas. (i.e. how is the tetrahedralization method used in the technological arts, and is this a computer implemented method, or simply a mental process augmented with pencil and paper?). Accordingly, the examiner maintains the 35 USC 101 rejection of claims 1-13 and 19-20.

Regarding applicant's response to 112(1) rejection of claims 14-18: The examiner withdraws the 112(1) rejection of claims 14-18 in view of applicant's amendment to the specification and drawings filed 14 April 2005.

Regarding applicant's response to 112(1) rejection of claims 1-2: The examiner withdraws the 112(1) rejection of claims 1-2 in view of applicants arguments filed 14 April 2005.

Regarding applicant's response to 103(a) rejections: The main trust of applicants Argument's has focused on alleging that the examiner has not provided sufficient motivation to combine the prior art references. The examiner maintains that the motivation to combine Albertelli and Chazelle is proper and in accordance with MPEP guidelines for the following reasons. MPEP 2143.01 Suggestion or Motivation To Modify the References first recites:

"There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." In re Rouffet, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998)

In this case the examiners rejection first addresses the nature of the problem to be solved, namely, subdividing unstructured mesh elements in a non-conformal mixed

element mesh and dynamically checking for degree of freedom (DOF) values, relative to the teachings in the prior art. More specifically, that a skilled artisan would have made an effort to become aware of what capabilities had been developed in the market place, and hence would have knowingly modified Albertelli with the teachings of Chazelle. (See: office action page 9, paragraph 2) MPEP 2144 Sources of Rationale Supporting a Rejection Under 35 U.S.C. 103 recites:

> "The rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). See also In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) (setting forth test for implicit teachings); In re Eli Lilly & Co., 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990) (discussion of reliance on legal precedent); In re Nilssen, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988) (references do not have to explicitly suggest combining teachings)"

The examiner has simply asserted that a skilled artisan tasked with solving the problem of subdividing unstructured mesh elements in a non-conformal mixed element mesh (i.e. as taught by Albertelli), and dynamically checking for degree of freedom (DOF) values (i.e. as taught by Chazelle), and further having access to the teachings of Albertelli and Chazelle, would have knowingly modified the teachings of Albertelli, with the teachings of Chazelle in order to gain the advantage of reduced cost and development time. Specifically, a skilled artisan working in this obviously competitive environment would have made an effort to become aware of what capabilities had already been developed in the market place, and hence would have been aware of, and known to seek out the relative teachings of the problem to be solved. Namely, the teachings of Albertelli and Chazelle.

MPEP 2143.01 Suggestion or Motivation To Modify the References further recites the following supporting rational:

> "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000)."

The examiner therefore appears to have established an implicit showing that in view of the combined teachings of the prior art, the relative knowledge of one skilled in the art, and in particular, the nature of the problem to be solved, there exists an obvious motivation to combine the references as noted above.

Applicants further argue that the claimed invention is distinguished over the prior art because the tetrahedralization is directed toward an initially constrained mixed element mesh as apposed to the unconstrained meshing in the prior art. However, the examiner notes that no specific features relating constrained or unconstrained meshes are recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). In this case applicant's arguments are clearly more specific than the claims require.

Also, applicant's argument the that the prior art does not teach that the DOF value is "stored" for each element is not persuasive since the examiner has established that this feature is obvious in view of the reasoning set forth below under 103(a) rejections. (please see 103(a) rejection below)

Applicant's argument that Bonnaeu is somehow not analogous art is also not persuasive since Bonnaeu is clearly directed toward geometric modeling in CAD applications (See: Section 1) as is the claimed invention (See: page 1, applicants specification, i.e. CAD modeling of semiconductor components). Hence, Bonnaeu would have also knowingly been incorporated by a skilled artisan using the reasoning set forth above. The examiner therefore maintains the 103(a) rejection of claims 1-13 and 19-20.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-13 and 19-20 are rejected under 35 U.S.C. 101 because the claimed invention is drawn to non-statutory subject matter.

Specifically, claims 1-13 and 19-20 are not technologically embodied since the claims have not recited any limitations relating to a practical application in the technological arts and have merely claimed a manipulation of abstract ideas (tetrahedralization - mathematical constructs) and non-functional descriptive material (dynamic directory) which are not tangibly embodied.

Specifically, independent claim 1 recites a dynamic directory that is not tangibly embodied (i.e. no hardware) while independent claims 3, 14, and 19 recite tetrahedralization (i.e. mathematical abstract ideas) by abstract steps performed without hardware. (Independent claim 14 recites a tetrahedralization filter but the disclosure does not reveal how the filter is realized, see 112(1) rejection below). The Examiner

therefore submits that Applicant's have not recited any limitations that provide a tangible result and have merely claimed a manipulation of abstract ideas realized as mathematical constructs that are not tangibly embodied. Section 2106 [R-2] (Patentable Subject Matter — Computer-Related Inventions) of the MPEP recites the following:

"In practical terms, claims define nonstatutory processes if they:
– consist solely of mathematical operations without some claimed practical application (i.e., executing a "mathematical algorithm"); or
*– **simply manipulate abstract ideas**, e.g., a bid (Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759), **without some claimed practical application**."*

*An invention which is eligible for patenting under 35 U.S.C. § 101 is in the "useful arts" when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The fundamental test for patent eligibility is thus to determine whether the claimed invention produces a "**useful, concrete and tangible result.**" The test for practical application as applied by the examiner involves the determination of the following factors:*

(1) "Useful" - The Supreme Court in Diamond v. Diehr requires that the examiner look at the claimed invention as a whole and compare any asserted utility with the claimed invention to determine whether the asserted utility is accomplished.

(2) "Tangible" - Applying In re Warmerdam, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. § 101. In Warmerdam the abstract idea of a data

structure became capable of producing a useful result when it was fixed in a tangible medium which enabled its functionality to be realized.

(3) "Concrete" - Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

The Examiner respectfully submits, under current PTO practice, that the claimed invention does not recite either a useful, concrete, or tangible result and is merely drawn to a manipulation of abstract ideas (tetrahedralization) and non-functional descriptive material (dynamic directory).

- *The invention is not **useful** since independent claims 1, 6, and 11 do not recite a result that is useful in the technological art. This makes it difficult to determine Applicant's invention since it merely claims a manipulation of abstract ideas by tetrahedralization. (The patent eligibility standard requires **significant functionality to be present to satisfy the useful result aspect** of the practical application requirement. See Arrhythmia, 958 F.2d at 1057, 22 USPQ2d at 1036.)*
- *The claims are not **tangible** since, for example, the results of the "trade-off relationship between objection functions is undefined. No tangible result is recited as a result of performing the element subdivision.*
- *The claims are not **concrete** because the results are not assured. For example, is a solution possible for any and all arbitrary inputs? (i.e. any element subdivision?)*

Dependent claims 2, 4-13, 15-18, and 20 inherit the defect of the claims from which they depend.

Claim Objections

4. *Claim 1 is objected to because of the following informalities:*

Claim 1 as currently amended is not written in proper idiomatic English. The recitation "comprising: a respective degree of freedom value is stored for each element" does not make sense. The examiner believes the word "is" should be omitted. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Efficient Subdivison of Finite-Element Datasets into Consistent Tetrahedra", G. Albertelli, IEEE 0-8186-8262-0/97, IEEE 1997 (of record) in view of "Bounds on the Size of Tetrahedralizations", B. Chazelle et al, 10th Conference on Computational Geometry, ACM 1994.

Regarding independent claim 1: Albertelli teaches subdividing unstructured mesh elements inclusive of a non-conformal mixed element mesh which is sub-dividable into tetrahedral (Abstract, Sections 1, para: 1, Section 2, para: 3, 4, Section 3, para: 1-5, Figs. 3, 4).

Albertelli does not explicitly disclose minimizing Steiner points using a dynamic directory of degree of freedom value during tetrahedralization.

Chazelle teaches dynamically checking for the addition of Steiner points (pp. 231, para: 2-5, 235, para: 1) during tetrahedralization by reducing to the lowest value (one) for the degrees of freedom (DOF) (pp. 237, para: 2-3, Fig. 12). That is, the degree of freedom value in the teachings of Chazelle is always current as the element subdivision proceeds. The use of a dynamic directory is well-known in the data processing and would have been an obvious choice for storing the degree of freedom (DOF) data. The examiner notes that the Microsoft Computer Dictionary defines a "dynamic directory" as merely a method of "organizing by stored tables of data that are updated in real time" (i.e. dynamically). Hence, a skilled artisan would have knowingly created a dynamic directory for the degree of freedom values during the mesh

generation in order to efficiently track, store, and use the degree of freedom values during tetrahedralization.

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Albertelli relating to subdividing unstructured mesh elements in a non-conformal mixed element mesh, with the teachings of Chazelle relating to dynamically checking for the addition of Steiner points and degree of freedom values, to realize the claimed invention. An obvious motivation exists since, as referenced in the prior art, additional Steiner points increase the mesh size and require additional computational power (See Chazelle, pp. 231, para: 2). Accordingly, a skilled having access to the teachings of Albertelli and Chazelle, would have knowingly modified the teachings of Albertelli with the teachings of Chazelle, in order to reduce the number of Steiner points in the mesh to provide a smaller and more efficiently processed mesh.

Per dependent claim 2: As noted above the Microsoft Computer Dictionary defines a "directory" as a method of "organizing by stored tables of data" that further includes a "topmost root directory" and "subdirectories" which are organized in various ways including alphabetically, by date, by size, values etc. (See: Microsoft Computer Dictionary, third edition, 1997) Hence a skilled artisan would have knowingly organized the directory so the element subdivisions where ordered beginning with the low degree of freedom subdivision as a design choice (i.e. by size of the DOF value).

6. Claims 3-13 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Efficient Subdivison of Finite-Element Datasets into Consistent Tetrahedra", G. Albertelli, IEEE 0-8186-8262-0/97, IEEE 1997 (of record), in view of "Bounds on the Size of Tetrahedralizations", B. Chazelle et al, !0th Conference on Computational Geometry, ACM 1994, and in further view of "Polyhedral modeling", G. Bonneau, Proceedings Visualization '00, IEEE 2000.

Regarding independent claims 3 and 19: As previously cited above, Albertelli teaches subdividing unstructured mesh elements inclusive of a non-conformal mixed element mesh which is sub-dividable into tetrahedral (Abstract, Sections 1, para: 1, Section 2, para: 3, 4, Section 3, para: 1-5, Figs. 3, 4).

Albertelli does not explicitly disclose minimizing Steiner points by identifying the degree of freedom value during tetrahedralization.

Chazelle teaches checking for the addition of Steiner points (pp. 231, para: 2-5, 235, para: 1) during Chazelle teaches checking for (identifying) the addition of Steiner points (pp. 231, para: 2-5, 235, para: 1) during tetrahedralization by reducing to the lowest value (one) for the degrees of freedom (DOF) (pp. 237, para: 2-3, Fig. 12) by identifying to the lowest value (one) for the degrees of freedom (pp. 237, para: 2-3, Fig. 12).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Albertelli relating to subdividing unstructured mesh elements in a non-conformal mixed element mesh, with the teachings of Chazelle relating to dynamically checking for the addition of Steiner points

and degree of freedom values, to realize the claimed invention. An obvious motivation exists since, as referenced in the prior art, additional Steiner points increase the mesh size and require additional computational power (See Chazelle, pp. 231, para: 2). Accordingly, a skilled having access to the teachings of Albertelli and Chazelle, would have knowingly modified the teachings of Albertelli with the teachings of Chazelle, in order to reduce the number of Steiner points in the mesh to provide a smaller and more efficiently processed mesh.

Albertelli further does not explicitly disclose performing mesh element subdivison based on the degree of freedom values of the elements.

Bonneau teaches subdividing mesh elements based on the degree of freedom values of the elements. (pp. 382, Section 2.1, Fig. 1) That is, the subdivision process disclosed by Bonneau is based on the introduction of the degree of freedom value into the mesh patch. (Sections 2.2-3.4) The examiner interprets this process to be functionally equivalent to the claimed process of subdivison based on the degree of freedom value of the elements.

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to further modify the teachings of Albertelli and Chazelle as noted above, with the teachings of Bonneau relating to subdividing mesh elements based on the degree of freedom value, to realize the claimed invention. An obvious motivation exists since, as noted above, additional Steiner points increase the mesh size and require additional computational power (See Chazelle, pp. 231, para: 2). That is, more Steiner points are problematic as noted by Chazelle. Accordingly, a skilled

having access to the teachings of Albertelli, Chazelle, and Bonneau would have knowingly further modified the teachings of Albertelli and Chazelle with the teachings of Bonneau, in order to further reduce the number of Steiner points in the mesh to provide an even smaller and more efficiently processed mesh.

Per dependent claim 4: Albertelli teaches subdivisions based on most-constrained elements. (pp. 215, Section 5.0)

Per dependent claim 5: Albertelli discloses alternating/opposite subdivisions of faces (i.e. the subdivisions look ahead) (pp. 214, Section 3.0).

Per dependent claim 6: As noted by applicants on page 2, line 23 of the specification, Dompierre criteria is well known and hence would have knowingly been incorporated by a skilled artisan to subdivide elements into tetrahedral.

Per dependent claim 7: As noted above, a skilled artisan would have knowingly created a dynamic directory for the degree of freedom values during the mesh generation in order to efficiently track, store, and use the degree of freedom values during tetrahedralization. (See Chazelle, "directory" above)

Per dependent claims 8-13: This group of claims merely relates to updating the degree of freedom data. As noted above, the claimed "directory" for DOF data is a method of "organizing by stored tables of data" that further includes a "topmost root directory" and "subdirectories" which are organized in various ways including alphabetically, by date, by size, values etc. (See: Microsoft Computer Dictionary, third

edition, 1997) Hence a skilled artisan would have knowingly updated the DOF directory after element subdivisions out of necessity in maintaining the DOF directory.

Per dependent claims 11-12: Breadth-first searching is a well-known search technique (See: "search techniques", Encyclopedia of Computer Science, first edition 1976) used in data processing and would have been knowingly incorporated by a skilled artisan using the reasoning previously cited above. Albertelli teaches subdivisions based on most-constrained elements (pp. 215, Section 5.0) as noted above.

Per dependent claim 20: As previously cited above, Chazelle teaches dynamically checking for the addition of Steiner points (pp. 231, para: 2-5, 235, para: 1) during tetrahedralization by reducing to the lowest value (one) for the degrees of freedom (DOF) (pp. 237, para: 2-3, Fig. 12).

Allowable Subject Matter

7. Claims 14-18 have been allowed over the prior art of record.

The following is an examiner's statement of reasons for allowance:

Applicants are disclosing a tetrahedralization filter for associating subdivided mesh elements with a DOF value from a directory. This has been disclosed in the prior art of record. While these features are individually disclosed in the prior art, the prior art of record does not meet the conditions as suggested in MPEP section 2132, namely:

"The identical invention must be shown in as complete detail as is contained in the ... claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this

*is not an **ipsissimis verbis** test, i.e., identity of terminology is not required. **In re Bond**, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990)."*

In particular, the prior art of record does not disclose the specific arrangement of elements consisting of: a receiver for non-conformal mixed element mesh data, a processor dynamically associating subdivided DOF elements, and an element subdivider discriminating subdivision based on DOF directory, as recited in independent claim 14 and disclosed in applicants specification in the passages beginning on page 14, line 4, and in Figure 7.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

*8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).*

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Careful consideration should be given prior to applicant's response to this Office Action.

U.S. Patent 6,625,938 issued to Shimada et al teaches subdivision of mesh elements and tetrahedralization.

"Progressive Tetrahedralizations", O.G. Staadt et al, IEEE 0-8186-9176-x/98, IEEE 1998 teaches subdivision of mesh elements and tetrahedralization.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Ferris whose telephone number is 571-272-3778 and whose normal working hours are 8:30am to 5:00pm Monday to Friday. Any inquiry of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is 571-272-3700. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jean Homere can be reached at 571-272-3780. The Official Fax Number is: (703) 872-9306

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